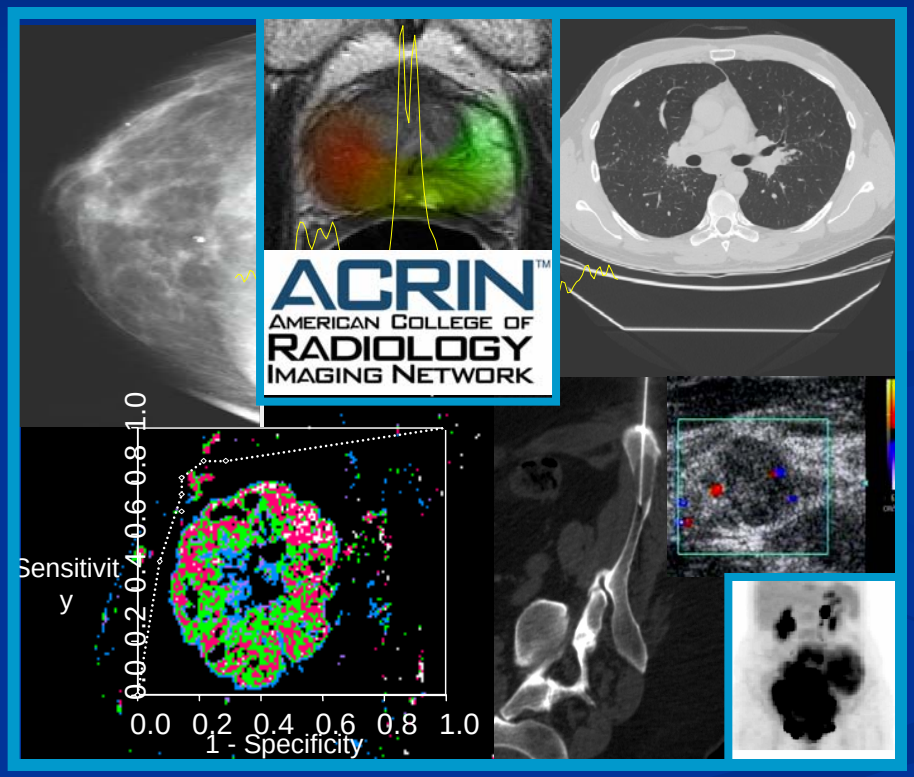
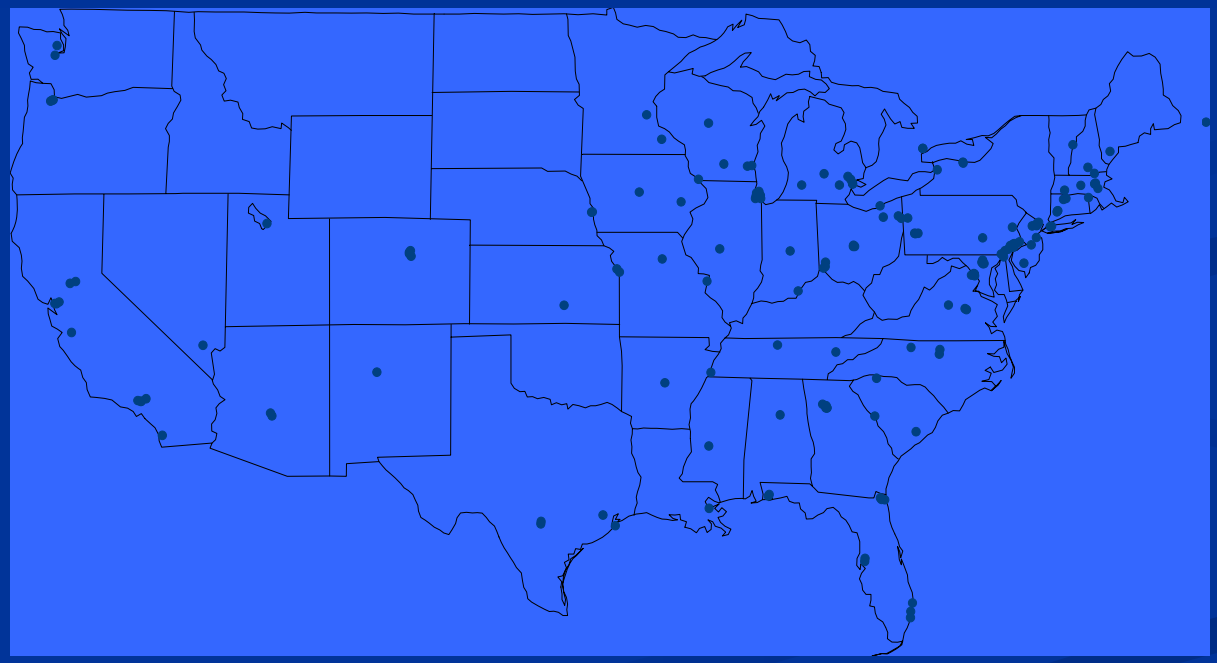
Standards for Imaging Data: ACRIN Vision



ACRIN™
AMERICAN COLLEGE OF RADIOLOGY IMAGING NETWORK

ACRIN represents a network of over 100 institutions in the US, Canada and Europe that has accrued over 70,000 subjects onto imaging clinical tails



ACRIN Imaging Network & Archive

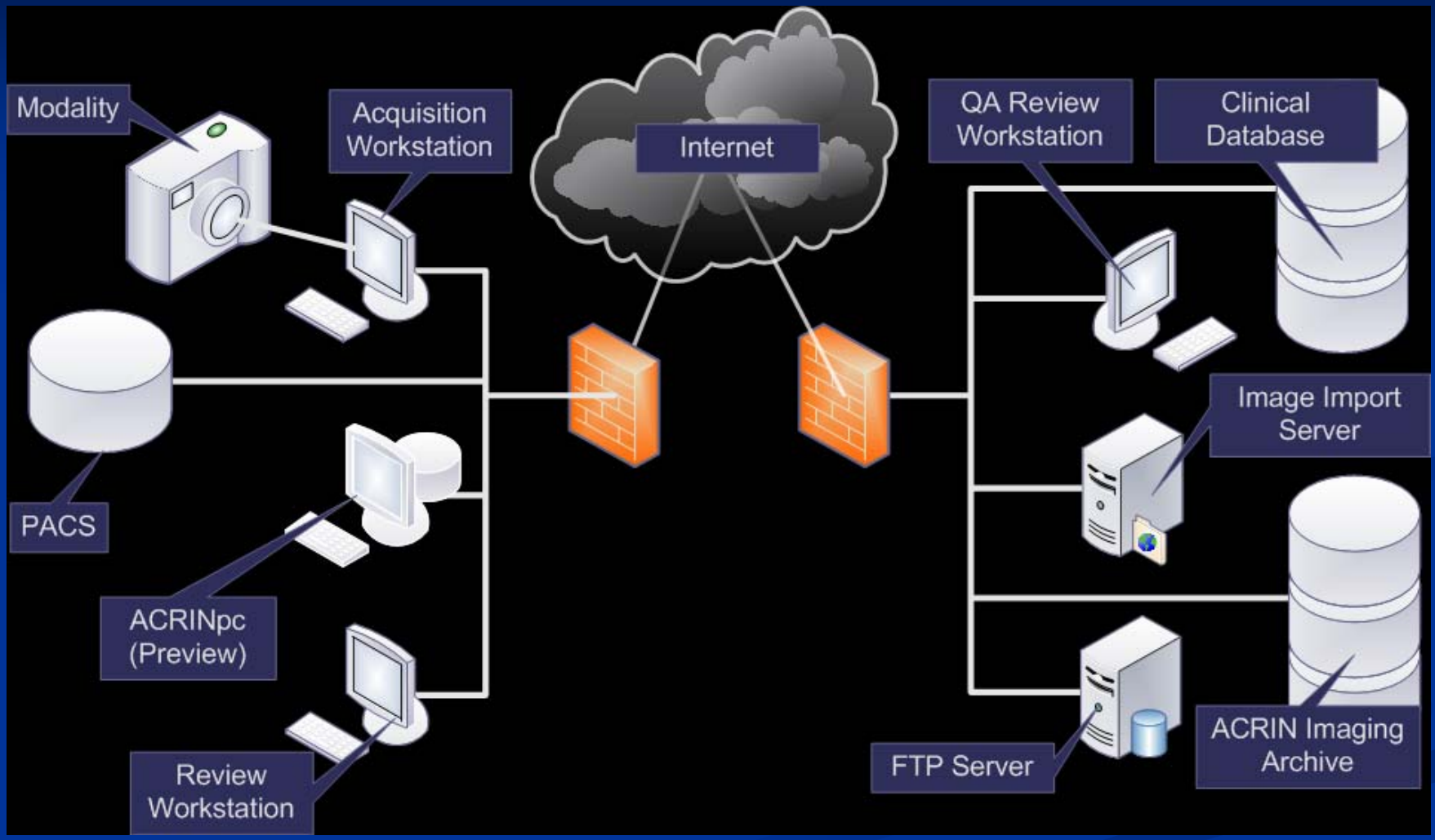


Image Collection as of 6/2006

6651 CT	169	59,963	17.8 GB	
6651 MR	175			
6664 CT	2250	2,648,000	1,313.00	
6652	49,500	335,000	5.88 TB	
6654	18,893	9,851,000	4.834 TB	
6657	232	355,900	89.2 GB	
6659 MRS/I	61	17,000	3.1 GB	
6660 **w/PET**	93	160,000	51.5 GB	
6661	115	19,500	9.1 GB	
6662	49	20,500	2.7 GB	
6665 CT	178	18,000	8.7 GB	
6665 **PET**				
6666 w/Ultrasound	2,782	154,500	196 GB	
6667	1072	650, 000	195 GB	
OTHER	770	657,500	532.29	
Totals	**76,339**	**14,296,863**	**13.1 TBs**	

ACRIN Imaging Core Laboratories

Developing Internal Standards

- Imaging Quality Assessment
  - System qualification (calibration, performance)
  - Exam Quality (protocol compliance, image quality)
- Qualitative imaging Interpretation
  - Standard of practice
- Quantitative Imaging Analysis (Size, Signal)
  - Standards for documentation of process
  - Developing standards for reproducibility
    - Test Set / performance statistics

Challenges to Analysis

- Variable image reconstruction results in variable partial volume effects
- "Raw Data" already processed with manufacturer specific processing
- No agreement on what "signal" to measure or how to represent it
- No means of validating analysis
  - Precision / Accuracy against standards
  - Predict outcome for patient cohort

Value of Image Repositories: Importance of Linked Metadata

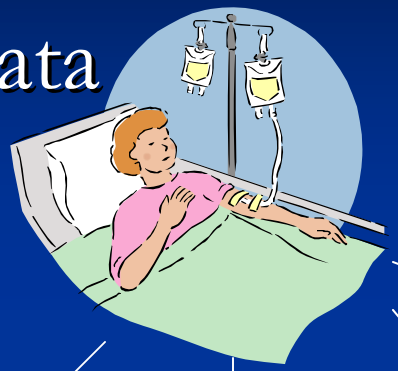
CRF Data

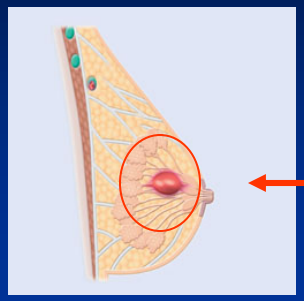
Images

- Provide sample cases for analytical development
- Provide test sets to validate analysis
- Rich environment to develop hypotheses.

Image meta-data: Standard Structure and Data Elements

Patient level data





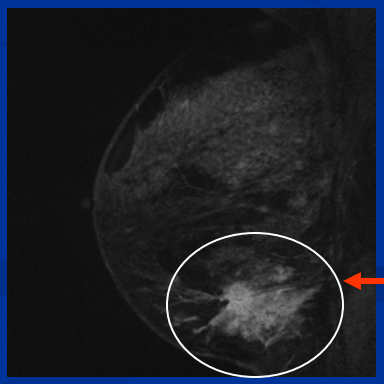
Standards for linkage

Image Exam level data

-modality
-protocol
-exam descriptors

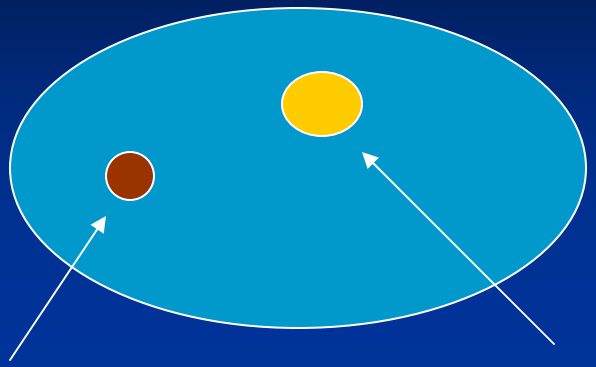
Image Finding level data

-Location (annotation)
-Size
-Margin
-intensity
-texture



Time

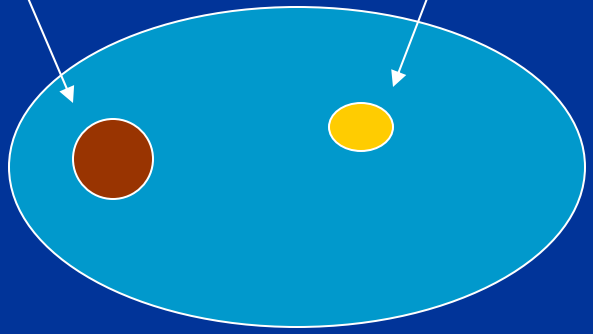
Modality 1
Time 1



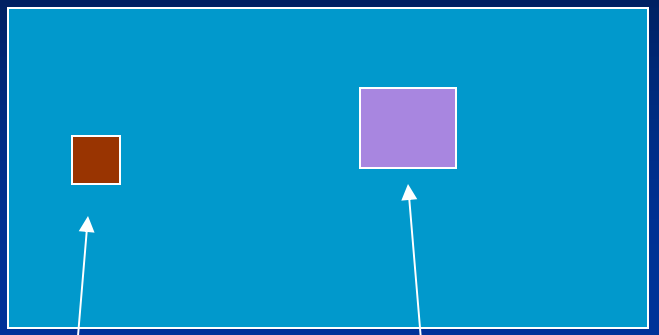
M1 Finding 1
Lesion 1

M1 Finding 2
Lesion 2

Modality 1
Time 2



Modality 2 Time 1



M2 Finding 1
Lesion 1
-Size
-Shape
-Location
-Intensity
-etc

M2 Finding 2
Lesion 3

Path
Lab
Micro
Proteomics

Integrated Imaging Informatics

- Standards for imaging data
  - –Image
  - –Image annotation
  - –Structure for tracking lesions/findings
  - –Imaging CDE
  - –Standards for generating query based on CDE (including access control/authorization)
- Part 11 compliance
  - –Standards for tracking header changes
  - –Standards for tracking / validating processing

ACRIN's Contribution

- Experience
- Collaboration
- Data
  - Image data
  - Linked endpoint data
- Testing
  - Core lab validation
- Adoption
- Dissemination